Mr. Oscar Bessio, 3I-53, BuAer, Navy Dept. 9 May 1956

Secretary, SDIC Working Group on Propellants and Fuel Additives

Propellants Seminar

Pursuant to our conversation of a few days ago, I am sending you six (6) copies of the questions that Mr. Harris requested we send to: Mr. Robert B. Filbert, Jr.
Batelle Memorial Institute
505 King Ave.
Columbus, Ohio

Will you please forward them to Mr. Filbert?

25X1A9a [redacted]

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PROPELLANTS SEMINAR

Sets of questions prepared by Components of the EDIC Working Group on Propellants and Fuel Additives shortly after its 16 December 1955 meeting, for possible consideration by the Seminar.

Reproduced
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25X1A9a [redacted] date, RR, GM Staff; ICA; and OIR/E/C all agree that attached sets of questions might be downgraded to Confidential even tho originally classified Secret. Questions from Commerce left were

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ICA SUBMISSION

Certain specific information is needed to formulate United States export control policy on individual commodities. In this connection, it would be helpful to know the answers to the following questions concerning propellants.

1. Are they used primarily for military purposes? What other use is made of them?

2. Do they involve advanced technology?

3. What countries or companies know how to manufacture them?

4. Would it be practical to control their production by embargo of machinery necessary for their manufacture?

5. Would it be practical to control their development by control of raw materials?

6. Is there one critical material which could be controlled as the key?

7. Are the manufactured propellants in short supply in the Free World? In the Soviet Bloc?

8. Are the raw materials needed for their manufacture in short supply in the Free World? In the Soviet Bloc?

9. Does the United States have sufficient control over sources of supply to be able to frustrate the Soviet Bloc single-handed?

10. What are the world sources of supply?

11. Would control of exports tend to focus attention on their probable importance?

COMMERCE SUBMISSION

Question Set I

A. General

I. What is the function of a 'propellant' under different conditions (e.g., of height, air-density) or requirements (e.g., speed, distance)?

II. When is a propellant considered to be under the 'Munitions List' definition (see 875.14 of 'International Traffic in Arms') hence subject to international control as a munition?

B. Survey of Propellants - for aircraft, missiles, rockets, torpedoes.

I. How do requirements differ, illustrate a few applications?

II. In which specific field of application are magnesium and boron, or their compounds, especially suitable? What other metals have been tested in this area? What were the results?

III. Into which of these areas of use do hydrazine and its salts fall?

IV. Into which of these areas of use does cellulose nitrate (colloxylin) fall?

V. Into which of these areas of use do perchlorates fall?

C. Technical

I. Cellulose Nitrate (Colloxylin):

a. What characteristics permit differentiation between propellant and nonpropellant grades? (e.g., nitrogen content, viscosity, plasticization)?

b. Are the various types interchangeable (e.g., could beneficiation of a type with low nitrogen content result in the creation of a propellant grade from a nonpropellant grade?)

c. What does degree of purity mean in terms of fire control?

d. Are purity differences known to be important, i.e., as between grades made in the United States and those made in Western Europe?

e. With the known substantial availabilities to Russia of both high-alpha cellulose and the nitrate, what might their purpose be in endeavoring to purchase U.S. produced grades?

II. Perchlorates

a. Which chlorates and perchlorates are specifically involved in what areas of use?

b. Would it be desirable to include these under the 'Munitions List' to arrive at international control?

III. Hydrazine and hydrazine salts:

a. Which salts specifically have uses in the propellant field?

b. Would they (by interpretation be automatically included on the 'Munitions List' (as hydrazine and the unsymmetrical dimethylhydrazine are now included specifically)?

IV. Boron and its compounds:

a. Which specific compounds are important as fuels, or intermediates for such fuels, from the point of view of international trade controls?

b. How are they used - i.e., as direct fuels, as additives, in slurries?

c. If such specific data are not releasable, what general classes of compounds are involved?

d. Is boric acid an intermediate step in U.S. production of these critical boron compounds? Can they be made from sodium borate crudes without going through boric acid? Can they be made from calcium borate crudes without going through boric acid? Bearing in mind the short supply situation in the Bloc and the availability of calcium borate crudes from Turkey, could sodium perborate be used economically there as a source of the critical boron compounds?

e. What is known of Soviet Bloc technological advancement in this field?

V. Magnesium

a. Is the use of magnesium in propellants limited to the metal only, or are certain compounds also involved?

b. Knowing that there is plenty of magnesium available to the Bloc, as there is in the United States, what is the bottleneck to immediate use of the metal (e.g., fine particle size production, slurry production, proper engine structure, or after-burner construction)?

c. What is known of technological advancement by the Bloc in this field?

QUESTION SET 2

Magnesium

1. What type plant is involved in producing magnesium powder or slurry?

2. Is the equipment in which the powder or slurry is produced complicated, requiring specially designed parts and assemblies?

3. Are large quantities of electric power required to produce the powder or slurry concentrate from the metal?

4. Does the creation of an "inert atmosphere," (necessary in the preparation of the powder or slurry), involve any advance technology or scarce materials or commodities?

5. Are any special containers necessary for the storage of the slurry?

6. Is it possible to prolong the storage life of slurries by agitating the storage containers or the slurry if stored in bulk?

7. What are the characteristics of the exhaust from an aircraft using magnesium in afterburners?

CIA SUBMISSION

Question Set I

I suggest that the following items relating to guided missile propellants and oxidizers be discussed at the subject symposium on propellants and fuels.

A. A discussion of each fuel in the US missile program in research, development, or production with respect to:

1. Performance, ease of handling, degree of purity.

2. Raw materials specifications, manufacturing know-how, availability of manufacturing facilities.

3. Tonnage requirements on context with total produced.

4. Cost in terms of quantity production.

B. Which of these fuels in light of the above characteristics appear to be most promising as practicable operational fuels in Surface-to-Air, Air-to-Air, Surface-to-Surface, Air-to-Surface missile systems?

C. Which of these promising fuels require common raw materials as starting point, which require "exotic" materials?

D. A discussion of the advantages and disadvantages of solid fuels vs. liquid fuels in Surface-to-Air, Air-to-Air, Surface-to-Surface, Air-to-Surface missile systems. What is the trend in each missile system?

QUESTION SET II

Questions which might be asked of military technical experts in the field of research and development of high-energy fuels and propellants:

I. Of the various high-energy fuel and propellant research programs currently being carried on by or for US military services, which appear to be the most promising?

II. With respect to each of these more promising programs?

a. What component materials are required, and in what quantities:

1. In the development stages?

2. In full operation under peacetime conditions?

3. In wartime under full mobilization?

b. What equipment is required to produce the fuel or propellant? Is this equipment of standard design or specially designed and manufactured for this particular purpose? How can it be identified?

c. What materials are required and in what quantities for:

1. Manufacture of the fuel or propellant, other than as a component of the finished product?

2. Manufacture of the equipment used in making the fuel or propellant?

d. In what types of equipment will these fuels and propellants be used? Will it have to be designed specially for their use? If so, what time-consuming, technical, or operational problems result?

III. Of known potential types of high-energy fuels or propellants which do not appear to be the most promising at this time, which:1/

a. Have been abandoned?

b. Are still under active consideration for possible development and use at a later time?

IV. In the case of each1/ of the currently less promising high-energy fuel or propellant possibilities, is the reason for this evaluation of them:

a. Technical difficulties encountered in the development or manufacture of:

1. The fuel or propellant, itself?

2. The equipment required for the production of the fuel or propellant?

3. The equipment required to use the fuel or propellant effectively?

V. How do the various potential high-energy fuels or propellants compare with respect to probable

a. Performance?

b. Ability to store?

c. Transportability?

d. Cost of:

1. Development?

2. Production when in full-scale use?

1/ In view of the great number of potential high-energy fuels and propellants, it probably would not be practical to answer these questions in complete detail. However, perhaps they can be answered for groups of possibilities or for the most significant individual items falling within this description.